The Northwestern MILLER
MILLING PRODUCTION SECTION

Cookie Flour Studies

By Ralph C. Lakamp
The Kroger Food Foundation
Cincinnati

Soft wheat flours, by nature, are best suited for the production of cookies, crackers, cakes, donuts, pies, etc. These items are products which all possess good nutritional value, taste appeal and variety. All of these items are well suited to compete successfully with other foods. Therefore, they offer considerable promise for the future in maintaining wheat's important place in the American diet.

Baked products making use of soft wheat flours are being produced commercially in greater and greater volume. Mechanization and large scale production methods are becoming more popular, with the result that more stress is being imposed on the specific adaptability and uniformity of the flours used.

The effort expended on the science and technology of soft wheat, soft wheat flour and its application to baking has been very nominal when compared to the work done on hard winter wheat. The surface has been barely scratched so that there exists a large field for research.

It was with this knowledge in mind that a planned series of studies was started in an effort to learn of a better method of milling soft wheat so as to produce a more satisfactory and uniform cookie flour.

Use of Both Criteria

Over the years milling chemists and bakers have employed apparent viscosity as an index of the quality of flour for making cookies. Although it is a useful guide, shop experience does not always confirm the indications obtained from the test. Experience has shown that the spreading property of a flour obtained from the AACC cookie baking test is a more dependable index of shop performance than apparent viscosity. However, the use of both criteria permits a better evaluation than either one alone.

An instance was encountered where two mills drawing wheat from the same general area produced flours of different cookie making quality, thus giving rise to this investigation to determine whether this could be attributed to differences in milling. The experiments were designed to secure information on the effect of several variabls in cookie making quality, including the nature of the wheat, the crop year and the milling technique. The effect of storage on the cookie making value of flours was also investigated. This involved comparison of cookie baking tests where the flours were stored for eight months at 5° C.

Seven Sets

In conducting these experiments, seven sets of flour and mill streams were obtained as follows:

1. Mill A (Michigan); early portion 1949 crop.
2. Mill A (Michigan); late portion 1949 crop.
3. Mill A (Michigan); 1950 crop.
4. Mill B (Michigan); 1949 crop.
5. Mill B (Michigan); 1950 crop.
6. Mill C (Washington); 1949 crop.
7. Mill C (Washington); 1950 crop.

In addition to the determination of moisture, ash and protein by the usual methods, the apparent viscosity of each flour was determined by the method described in Cereal Laboratory Methods, except that the digestion period was omitted. The maximum viscosity value, regardless of the increment of acid employed, was recorded as the apparent viscosity. Samples collected from Mill A during the early part of the 1949 crop were baked by the AACC cookie test. These flours were then stored as indicated above after which apparent viscosity and cookie baking tests were again made. The results obtained from the early part of the 1949 crop are recorded in Figures 1 and 2. The corresponding data for samples obtained from this same mill from the late portion of the 1949 crop are shown graphically in Figure 3.

Spread Factor

The spread factor decreases in general from the head to the tail of the mill; it also decreases progressively within each section of the mill. The break streams yield flours of superior spreading values to the middlings streams. In general as the spread factor diminished, the protein, ash and apparent viscosity increased. Both the quantity and the quality of the flour proteins seem to influence the spread factor, as the relation between apparent viscosity and cookie quality is not particularly good.

Photographs of cookies made from the flours listed in Figures 1 and 2 are reproduced in Figure 4. Cookies made from the break streams diminish in diameter, lose the characteristic cracked appearance on the top, and become smoother in progressing

(Continued on page 16a)

Mill A
Beginning 1949-50 Crop Tested November 1949
Ash and Protein Content of Mill Streams

	% Moisture	% Ash @ 14% Moisture	% Protein @ 14% Moisture
90% Patent	12.6	0.360	7.80
10% Clear	11.2	0.780	9.20
First Break	12.7	0.265	5.85
Second Break	12.0	0.285	5.55
Third Break	12.4	0.308	6.90
Fourth Break	12.3	0.435	7.75
Fifth Break	12.1	0.640	8.75
Break Sifts #1	13.0	0.330	6.90
Break Sifts #2	13.2	0.335	7.00
Break Sifts #3	13.1	0.360	8.45
Sizings	12.7	0.330	6.80
First Midd	12.2	0.290	7.00
Second Midd	12.0	0.300	8.00
Third Midd	12.1	0.350	8.30
Fourth Midd	12.1	0.330	9.35
Fifth Midd	12.1	0.490	9.50
First Tailings	12.8	0.450	6.80
Second Tailings	12.8	0.710	8.10
First Low Grade	11.9	0.585	10.00
Second Low Grade	11.6	0.725	10.80
Feed Reel	11.4	0.960	10.80
Finishing Reel	11.2	0.810	10.65
Third Clear Reel	11.8	0.890	9.40
B-S Duster	12.6	0.880	9.15

FIG. 1—Analytical data for streams obtained from Michigan Mill (A) from the early part of the 1949 crop.

Mill A
Beginning 1949-50 Crop · Tested November 1949
Apparent Viscosity and W/T of Mill Streams

	Apparent Viscosity	W/T	% by Weight of Flour
90% Patent	37	9.6	
10% Clear	R3	7.5	
First Break	15	11.3	3
Second Break	18	11.3	6
Third Break	34	10.3	6
Fourth Break	34	9.3	4
Fifth Break	20	8.9	3
Break Sifts #1	30	9.9	8
Break Sifts #2	35	9.7	
Break Sifts #3	58	9.5	
Sizings	22	9.9	4
First Midd	36	9.5	15
Second Midd	65	9.0	15
Third Midd	58	8.6	10
Fourth Midd	68	8.6	4
Fifth Midd	46	7.7	4
First Tailings	19	9.7	3
Second Tailings	23	8.2	3
First Low Grade	39	7.0	4
Second Low Grade	19	6.6	3
Feed Reel	33	5.7	
Finishing Reel	19	6.9	
Third Clear Reel	16	7.5	
B-S Duster	14	8.2	5

FIG. 2—Analytical data for streams obtained from Michigan Mill (A) from the early part of the 1949 crop.

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The American Milling System

By H. K. Swan
Allis-Chalmers Manufacturing Co.

EDITOR'S NOTE: A highlight of the 1954 technical conference of the Association of Operative Millers was a forum of the world's largest mill designers and builders. One of the participants was H. K. Swan, manager of the grain and milling machinery section of Allis-Chalmers Manufacturing Co., Milwaukee. The accompanying article is the text of Mr. Swan's talk at the conference and is from the AOM Bulletin.

The American system of milling has undergone few changes since the advent of the roller mill except to get more production per lineal inch of roll surface. This in a sense has resulted in a shortening of the system with a resultant smaller building and lower costs for installation, maintenance, and operation.

Probably the increased production per unit developed in this country during recent years has been partly rsponsible for the shrinkage of units or milling companies. The Northwestern Miller directory issued in 1951 listed 1,799 mills with a daily rating in cwts. of 1,282,796. The 1953 edition of this directory shows 1,044 mills with a total rating of 1,154,245 cwts. There is no doubt that the keen competition for the food dollar has played its part, too, in shrinkage of capacity.

It is estimated that the wheat kernel contains 85% endosperm. Possibly this could be recovered almost in its entirety, but where in this country is the market for 80-85% flour? So we mill for an approximate 72-76% extraction and our flour trade has been educated accordingly. When we talk about extraction, what are we going to call flour?

There has been little or no change from the basic flows designed by the leading engineers of their time, L. I. Ziegler, James Forrest and W. D. Grey. Except two years ago we started the use of sifters on the tail end and discontinued the manufacture of reels. You men have injected ideas here and there in your own mills—our flow sheet men have made refinements to suit individual problems, but basically, the American flow remains unchanged. There should be little wonder why a longer system was not adopted in the early development of the American system. I am sure if, by a longer system, mills could produce more marketable flour we would not hide our heads in a barrel, for the mill owner is no different in his desire to make more money than our leaders in other industrial fields, who lead the world in production methods and production per unit of products. A blacksmith may come along some day and develop a simpler way to make flour—it has been tried by numerous people who thought we all were crazy. Hammer mills, impact mills, and the flotation system were tried, but were given up. Our research people and engineers have given a lot of thought to a new development for milling wheat.

Quality of Flour

We have seen nothing to indicate that the quality of flour produced in this country is inferior to that produced elsewhere. The mills in this country are compelled to meet high standards. By this we mean, they must mill to meet definite specifications that vary with the trade and individual customer requirements. Probably the requirements here are more rigid than anywhere else in the world, and the miller is called upon to change the mixes more frequently than is the usual practice elsewhere which results in control of operations and operating ability that are unique.

There is a lot of talk about roll speeds—some say high speeds create excessive heat—some advocate water cooled rolls. In our 9-inch mills and 20-inch flaking mills, water cooling is available—but are the complications and cost of water joints justified? The speed of rolls in this country has been gradually stepped up from 450 RPM to over 600 RPM. I know of one plant operating at 670 RPM. Here we saw cool grinding with a thin stream, and producing over 4,000 cwts. originally designed for 3,000 cwts. This plant is competing with the best in the country, and I might add, they are exporters, too. Here the usual American ingenuity was applied—the mill was in a rich market—they needed more capacity so they got an additional 1,000 cwts. by a change in

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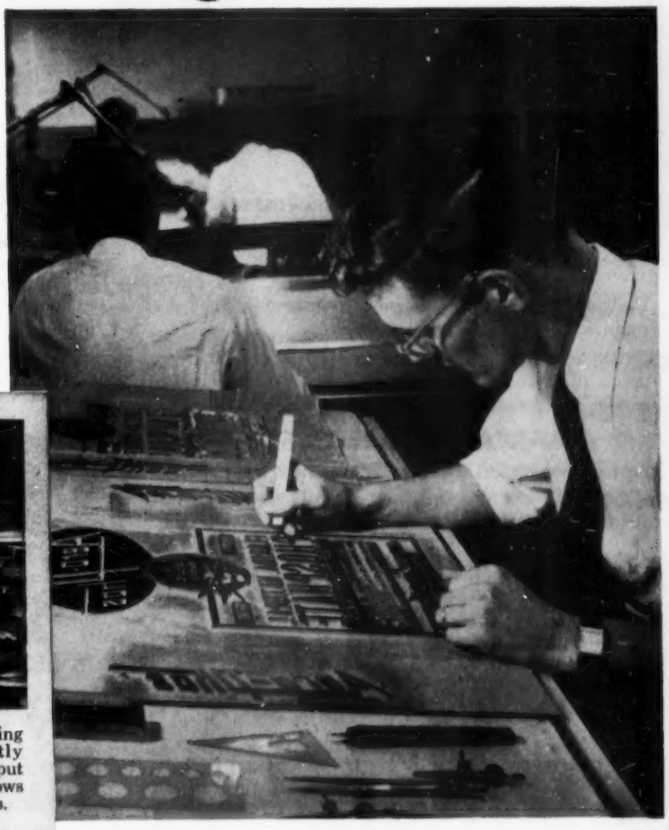

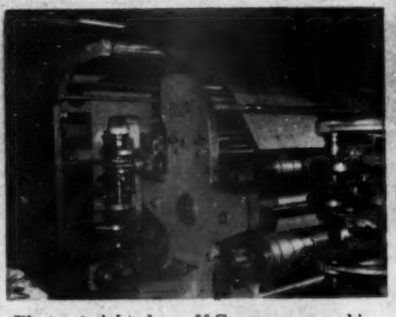

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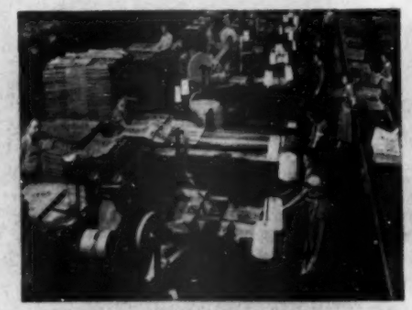

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Texrope sheaves, and of course, a good operation—the mills are Allis-Chalmers battery driven mills with roller chain differentials.

Recently much has been said about the design of plants. The facts have been confused with talk against multiple-floor mills. There are some advocates for one floor mills. We have been consulted about this—Allis-Chalmers can design such a plant, but a study of the economics surrounding the building of a mill must be considered before a decision can be reached on the type and size of building to be erected. The size, shape of real estate, its location, and transportation generally are the controlling factors together with capacity—don't lose sight of the many things that have set the lines for the way we do things in this country. We all know that a multiple-floor mill results in the lowest investment, for you can take full advantage of gravity flow. You know all about this so we won't dwell on it.

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mill technicians and power engineers work closely together in the solution of problems incident to driving milling equipment—the cost of power in a mill is important, so we give all power problems thorough attention, and have the talent to make recommendations that are proper in every case and meet the requirements of power company for lowest rates.

Now we get down to the individual machines that make up a mill—we won't say much about grain cleaning, but the manufacturers here have made big advances in cleaning equipment, which are recognized over the entire world, and this is true of bulk flour storage and high speed packing. We feel the American grain cleaning system is adequate, modern and economical to operate.

We realize that washers made abroad are being used in this country and with success. I have been told improvements in American equipment of this type are warranted. However, the amount of water used is a factor, and extremely important in several sections of the country.

Dust Collecting

I will touch only briefly on dust collecting as we have not gone into the manufacture of this type of equipment. There are good dust collectings systems manufactured in this country as well as abroad. The American manufacturers, we believe, have kept in line with the requirements, and are offering systems that have received good acceptance by mills in this country and have proved their systems to be highly efficient. We use American equipment in our complete plant designs and for modernization jobs as well and have had good success with it. Bear in mind that the selection of dust collectors in this country has been dictated by the underwriters.

You will recall cloth collectors were discontinued many years ago in favor of the long cone metal type—cloth collectors were considered a fire hazard—now they are back with us again in a reversed principle—suction type. It will be interesting to you people here today to learn that our company for several years built the suction type of collector for the cement and chemical industries. A. M. Marsh, head of our milling section many years ago, saw the merits of such a dust collecting system for flour mills. He made numerous contacts about this among mills in Minneapolis and elsewhere and gave a talk on this subject before an AOM district meeting in Minneapolis on Sept. 23, 1944, but apparently, the mill owners did not recognize the enormous waste to dust losses to say nothing about the conservation of heat in the mill building, or the maintenance of high humidity. Also the low cost of home-made long cone-collectors was a factor in discouraging Mr. Marsh from pursuing the matter further at that time.

Pneumatic Flour Mills

The pneumatic type of mill is probably the most alive subject in the milling industry today. It is lively only by discussion and not by action on management's part. Allis-Chalmers has designed several pneumatic mills, and has a contract now to build an 8000-cwt. mill in South America. This plant will be equipped with our latest air set battery driven mills, free swinging sifters, and all-metal purifiers, with tip-over-valves for stock classification. This will be an individually motor driven job; in other words, there will be no lineshafts. Sifters and purifiers will be individually driven, and the rolls will be battery driven.

Our pneumatic designs have been shown to milling engineers and operators of various companies. We have been complimented on the engineering ideas we have developed to reduce building size and installation cost and at the same time provide a plant flexible in operation, a sanitary installation, and a cost for maintenance that will be extremely low per cwt. of production.

It is no secret that when pneumatic handling equipment is used in the cleaning system, it is possible to take advantage of the aspirating effect in the system to simplify the grain cleaning problem.

On tempering and conditioning we recognize there are some benefits to quick tempering and that there are some good devices on the market—manufactured here and abroad — but what about the costs involved and the benefits gained, the expense of operation including a steam supply, the boiler, and other equipment and personnel for operation?

The basic milling machines—the roller mill, sifter, and purifier—have been built for a longer time than most of us can remember—we have kept up with the demands on all of these units for maximum capacity per square foot of floor area based on demand. We have gone through lean and good times with the mills of the country—our files contain probably the greatest library of flow sheets and mill plans to be found anywhere. There have been times when we needed filing space—many of the draw-

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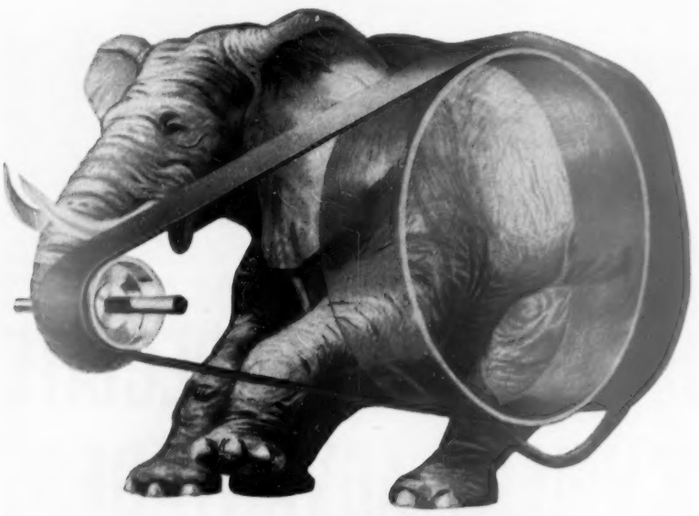
ings of mills built years ago were sent to the customers for their records rather than destroy them. One gets a lot of satisfaction out of a policy of this kind. We have microfilmed thousands of drawings to save filing space, and at the same time provide a good record of your mills and machinery.

Drawings

Probably the preservation of these old drawings has been one of the causes for the continued operation of many old plants. Had our company adopted a policy of destroying drawings after a few years of operation as is customary in many industries in this country and abroad, the milling machinery business at this time might be more attractive to the manufacturer. The short term replacement of mills abroad follows an entirely different policy than practiced here. This short term replacement may be the result of several economic factors including tax structure, and government controls. The industry here sorely needs a shorter term of write-off on capital equipment than now exists. This is being talked about in Washington and encouraged by President Eisenhower. If the write-off period is reduced to say five years, the attitude towards new machinery may change.

Let us consider that roller mill. This machine consists of two elements—feeders and grinding rolls. Rolls are generally started up Monday morning, and operated for several days continuously at the peak of their capacity. The roller mill must be a rugged machine—not too complicated, but built to run continuously, and it must be readily ac-



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cessible. The feeder must spread the stock the full length of the rolls, and the rolls must have a uniform depth of chill their full length, and the bearings in which the rolls are mounted must be carefully selected as to type and size. We mount 9-in. rolls in 3-in. bearings and 10-in. rolls in 3⅞-in. bearings. You can run rolls at most any speed you desire, but the American standards are well established, and we do not predict a serious change. Why pay for building space, installation and maintenance which is not necessary? The high cost of labor in this country, which now averages more than $2.40 an hour at our plant, must be reckoned with in manufacturing machinery, and construction work as well—this is our economy, and it must be supported. Needless to tell you, we would like to sell you more machinery for a given capacity if you think it is needed.

In the air set roller mill, a machine is offered which is functional in design—it contains the necessary elements for good operation—its high speed vibrating feeder is simple, but does its job well—another feature is the automatic roll throwout which causes the feeder to stop, and the rolls to spread when feed is interrupted—this feature will save corrugating expense and thus lengthen the life of rolls.

The rolls are centrifugally cast; that is, they are dual-metal, a soft core with a hard chill. This roll is known as the Circle Chill, an Allis Chalmers trade mark, the most important development in rolls for 30 years or more. Here our research people have played an important part in lowering your roll cost as the chill is of the same hardness throughout its entire depth. The rolls are mounted in either spherical roller bearings or shell type collar oiling as you prefer. The collar oiling type was designed around a long research program carried on by our people several years ago in connection with steam turbine bearings. On this work it developed that the length of the bearings could be 1½ times the bore—the old formula was 3 times the bore; in other words, if the bore is 3 in., the length should be 4½ in. as compared with 9 in. in the old formula. In the air set mill we decided a length of 6 in. would be about right for the work to be done—continuous operation, etc., and to minimize the friction load.

Bearings

It is obvious that a reduced length of bearings on roller mills reduces floor space. Our engineers in all of our new designs have kept in mind the high construction costs of this country, so as to reduce the floor space requirements to a minimum, but at the same time providing ample space for operators and maintenance.

The roll differentials in the air set mill are accurately maintained through roller chain drives—no gears or cross belts are necessary with our battery driven units. The air set mill will have long life as you have come to expect from American machinery, even though it has been subject to all kinds of abuse and heavy service. We believe there is too little research in mills on the testing of equipment, particularly roller mills—you can find out in no other way what a new development will do for you.

Operators who have Allis Chalmers battery driven mills have told us they would not want to go back to lineshaft driven units. We have several installations of this type—they have been running many years—developing many advantages in operation. The differentials are accurately held by roller chain drives—there are no flat belts to give you trouble and cause operating problems. An engineer of one of our customers some time ago made a survey among users of Allis Chalmers battery driven rolls—he found lower maintenance, a simpler operation and lower ash as compared to lineshaft driven mills.

Now about sifters. We believe it is pretty well established that our sifters—the Free Swinging—Low-Head, Nordyke, and Circle Sifters have flexibility in flow and method of drive to meet your requirements for high production and the wide variety of products demanded by our markets. The Nordyke type of sieve is widely used in this country and has become a standard in the industry. Our flow sheet men have worked hard at flow standardization. These flows have been proven to be flexible and interchangeability of sieves is an important feature because the number of spare sieves is minimized. As an example in a 2,000-cwt. mill, you would only require about 12 sieves for spares—as a minimum. The new bottom pocket offered in Allis Chalmers free swinging sifters plays a very important part in flow simplicity and sieve interchangeability. There is evidence of more sifter manufacturers going to the use of the Nordyke sieve stack.

The Nordyke sieve enables the operator to easily change the flow of any section at anytime. The sieve is square and, therefore, interchangeable with sieves in all stacks. It can be turned 90 degrees giving utmost flexibility in any reflowing job that may arise. The designer of this sieve surely made an important contribution to the industry when sieves of

PAPER SACKS FOR MILLERS
The Chatfield & Woods Sack Co.
CINCINNATI, O.

LEAVENING PROBLEMS?

...meet the family that can solve them

Monsanto SAPP-40

... ideal for machine doughnut mixes. Gives a fine texture and crust. Reduces tunnels. Cuts down on grease absorption, improves doughnut's shape. Here is a product that gives uniform action—every time.

Monsanto SAPP-28

... a slow-action baking acid, especially suited for cakes, biscuits, muffins. Has beneficial effect on gluten in flour; imparts greater extensibility and higher gas retention.

Monsanto HT PHOSPHATE

(MCP Monohydrate) ... versatile, effective, contains no free phosphoric acid, hence does not attract moisture and cause premature reaction with soda. Use it alone or in combination with other Monsanto leavening agents for good results.

Monsanto PY-RAN

(MCP Anhydrous) ... for stability never before possible in self-rising flour and cake mixes. PY-RAN gives a slow, controlled gas release during first two minutes of the mixing of the dough or batter. Tests clearly prove PY-RAN releases less CO_2 during first two minutes of the mixing of the dough or batter. This two-minute reading is especially important, as any CO_2 evolved during this time will be unavailable for leavening action in the oven.

PY-RAN: Reg. U. S. Pat. Off.

MONSANTO

For more information or a copy of the new booklet, "Monsanto Phosphate Leavening Agents," write to MONSANTO CHEMICAL COMPANY, *Inorganic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.*

SERVING INDUSTRY ... WHICH SERVES MANKIND

this type were made available to the mills.

Purifier

Now we come to the most controversial machine in the milling plant, and probably the one that gets the least attention—the purifier. I don't mind telling you our design people have been driven to almost a point of frustration on the wide range of ideas that have come to us from the field on how a purifier should be built. Don't take this as a complaint—ideas are fine if they do not present too many design and manufacturing problems.

In the Allis Chalmers all-metal purifier, we are offering a machine which is simple in design; it is not a copy of a former machine, but is believed to contain all the essential features to do the work for which a purifier is intended. We are still open to suggestions, but let us look at the machine somewhat in detail and discover some of its good points—due to design of hood and our belief that air should not be restricted at any point in the purifier above the cloth line, the amount of air required by actual field testing is only 35 CFM per sq. ft. of cloth area or 525 CFM for 30x74 in. machine—this means a minimum cost for power and equipment to handle the air.

In the early days of the sanitation program, the removal of spiral conveyors under the purifier was suggested, in lieu of which we were to use hoppers—this appeared to be a good solution for eliminating unsanitary conveyors—many machines were built this way, but now we have found a better method for stock classification. In our present purifier, we have made use of tip-over-valves which give flexibility equal to spiral conveyors with all of the objections removed on sanitation and maintenance. Twenty-seven valves are standard, graduated in width from 4 in. to 2 in.

Another important feature of this machine is the control of the sieve provided by the type of hangers on which the sieve is hung. In the Reliance, Nordyke, and many other purifiers, cables, connecting links, and other similar devices have been used. They had quick wearing parts causing misalignment of the sieve and consequent lack of control of stock over the sieves. In the Allis Chalmers all-metal purifier, the sieve is suspended on steel rods, divided in the center and connected with turn buckles to level and adjust the pitch of frame. These rods are mounted at

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THE
'PNEU-SPOUT'
SYSTEM
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Unlike old-style spouting, 'Pneu-Spout' is corrosion-free, sanitary, has few, yet simple parts, and eliminates large unnecessary stocks of spares. No complicated joinery or fitting is wanted. A robust 'Pneu-Spout' system is erected four times faster by unskilled labor with only three tools, and, when erected, the system is freer from chokes, easily cleaned, and all alloy parts can be used repeatedly.
A screwdriver, a hacksaw and a file —that's all you require to erect a "Pneu-Spout" system.
Robinson
OF ROCHDALE

WRITE TODAY for leaflet No. 468, which describes this revolutionary metal spouting method, to:

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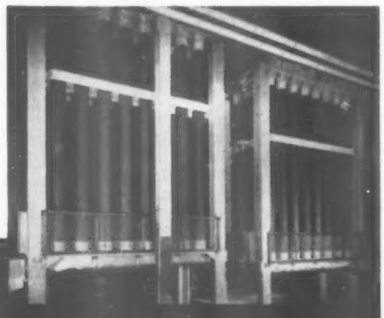

Photo shows two of the eleven DAY "AC" Dust Filters used by Pillsbury Mills, Inc. 99.99+ per cent filtering efficiencies consistently provided.

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DAY "AC" DUST FILTERS are doing an outstanding job for flour millers. We list five reasons why so many of the nation's millers use and reorder DAY Dust Filters.

1 Sanitary construction throughout.

2 Furnished with or with out housing, for pressure or suction, using only one main dust fan.

3 High air-to-cloth ratio requires minimum floor space.

4 Self-adjusting blow rings assure perfect tube cleaning.

5 Constant air volumes assured with continuous, automatic operation. No shutdown for cleaning.

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both ends in rubber bushings which require no adjustment, lubrication or maintenance. When once properly set, the sieve frame will remain in adjustment as there are no wearable parts. For further assurance of sieve control, stabilizers are supplied at both head and tail with exterior adjustment, which eliminates sidesway and whip. The machine is furnished with individual motor or pulley for lineshaft drive. When a comparison of purifiers is made, we would like to suggest our all-metal machine be used instead of comparing other machines with purifiers made by our company more than 40 years ago, as was done recently.

Roll Surface and Capacity

In these remarks it is not my intention to criticize mill design of any other manufacturer, but instead bring out the conditions that other designers are confronted with in meeting the conditions and requirements of their customers, and the problems that would be encountered here if we would adopt a longer milling system.

It has always been our understanding that European and English mill builders base their flow sheets on about 2 to 2½ lineal inches of roll surface per bbl. No doubt, there is a good reason for this—poor wheats, I believe, are a factor, and there may be other things I am not acquainted with on which the mill builders abroad base their engineering. In making the following comparisons I do not intend in any way to discredit the engineering of any other manufacturers, but instead, bring out the actual differences for the basis of figuring mills here and abroad and the reasons for them.

I have been told the foreign mill builders are now offering in this country mills following more closely the basic features of the American flow as to the amount of roll and sifter surface per cwt. A change of this kind involves many problems, speed of machines, bearings of suitable size, etc. I believe it would be interesting if the foreign mill people would discuss fully the needs of roll surface elsewhere in the world as compared with those of this country, and give comparative results as to extraction, quality, bearing in mind market requirements.

Here are some typical comparisons of machinery requirements between American and European mills with which we have come in contact in building mills and bidding against foreign manufacturers in the export field.

(a) A typical American mill built by Allis Chalmers was originally rated at 3,000 bbl. It has produced 4,000 bbl., or 8,000 cwt. per 24 hours. It has, I believe, 60 stands of 9x30-inch Allis Style "A" roller mills or 3,600 lineal inches of roll surface. As a comparison, one of the important mills built in England about four years ago is reported to have 92 stands of 10-in. roller mills, some 60 in. long, and the remainder 40 inches with an approximate total roll surface of 8,560 lineal inches. This mill is producing approximately 8,000 cwt. It is not difficult to imagine the increase in building requirements had the Allis mill been built with a roll surface equivalent to the English mill as we would have required 140 roller mills 9x30-in. size, or 100 of the 10x-42-in. size.

(b) Another good illustration is a mill built in Canada with English machinery using 22 stands of 10x40-in. mills or 1,760 lineal inches of roll surface, which according to the best information I have, is producing 1,300 bbl. or 2,600 cwt. in 24 hours. A mill built along American designs using this amount of roll surface could produce approximately 2,000 bbl. or 4,000 cwts.

(c) Another interesting comparison comes from the Julius Jurkow article in the March 9, 1954, issue of The Northwestern Miller in which Mr. Jurkow has made a very intelligent report on a mill equipped with German machinery producing approximately 400 bbl., using 16-10-in. Double Roller Mills with rolls approximately 40 in. in length. This is 1,280 lineal inches of roll surface which, over here would be ample for about 1,200 bbl.

(d) The complete cost for mills today in this country including receiving and cleaning machinery, milling equipment, bulk flour storage, reinforced concrete building, installation and power, is about $800.00 per bbl. Unless there is something that we do not see, it would not be economically sound for mills in this country to have a higher investment cost, and mill companies can not afford to reduce the output of their plants by putting in equipment that will not produce up to the American standards. Bear in mind the profit margin in this country is small, so the maximum production per square foot of building space is quite necessary.

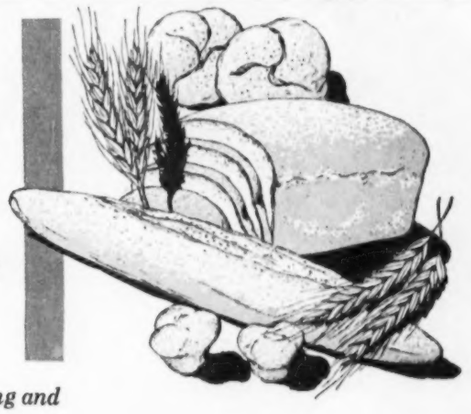
(e) We would like to sell more machinery for a given capacity, but frankly, can you afford to pay for more machinery than is actually required?

Mill Design

The trend today of mill design is towards the use of individual motor drives; that is, we do away with lineshafts and thus reduce the expense of maintenance and lubrication by a marked degree. No doubt, it is the experience of you men that electric

(Continued on page 13a)

FLOUR FOR MAN'S BREAD*



A Brief History of Milling and Baking by SCIENCE WRITER

CHAPTER III. *How Wheat Cultivation Migrated*

STARTED FROM ONE STRAIN

It is probable that all of today's varieties began with a single strain of wild grain. Very likely this was wild einkorn.

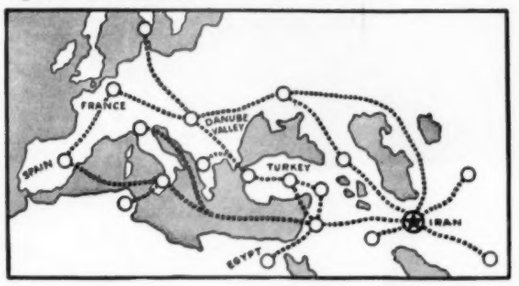
We know that this wheat was cultivated in Mesopotamia and central Asia Minor thousands of years ago. It was not a very satisfactory wheat, having a somewhat bitter taste and dark grains.

Another wheat, emmer, was widely cultivated in early agricultural days. Even today, it is found growing wild in Syria and Palestine and other places along the southern edge of the einkorn area. It must have been a popular grain because it has been discovered in early Egyptian settings and we know that it was grown in Europe's Danube Valley.

BREAD WHEATS DEVELOPED

The development of the bread wheats, caused either by matings with wild grasses or by an accidental doubling of the parent wheat's chromosomes, had an enormous influence on the spread of wheat-growing and milling. Most of these bread wheats have naked kernels and therefore are easier to mill. They have a better taste, too.

Fanning out from Iran where they probably originated, the bread wheats spread across Europe and Asia and into the Nile Valley in Africa. Einkorn and Emmer had been introduced earlier into these places, and the bread wheats followed them. The migration of the naked kernel wheats began about 2100 B.C.



GRAIN EMPIRES FORMED

Great grain empires grew up in Egypt along the Nile and in Mesopotamia beside the Tigris and Euphrates. These rivers were used to irrigate the grain fields which were thus made extraordinarily productive. So important was wheat-culture to these areas that even religious beliefs were bound up with the production of grain.

GRAINS GO ACROSS THE WORLD

During the Europeans' great period of colonizing beginning in the 1700's, wheat was carried to new lands in the temperate zones around the globe. It is interesting to note that today wheat-growing has been adapted to quite different climatic conditions from those under which it originally developed in Near Eastern countries.

VITAMINS AND WHITE FLOUR, WHITE BREAD

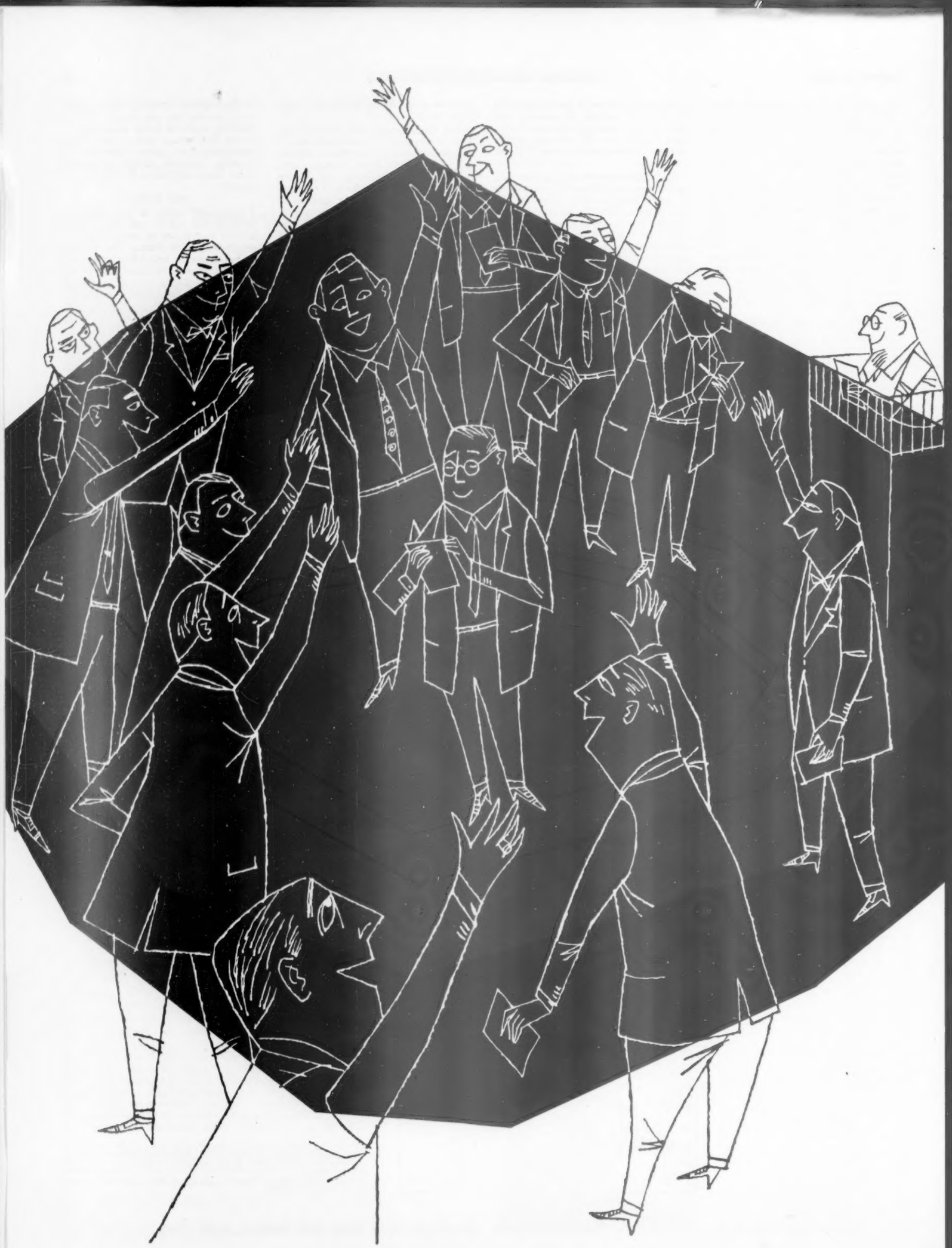
In the United States and Canada, as well as in other countries throughout the world, the enrichment of white flour and white bread is an accomplished fact. Enrichment is really a simple process. In milling wheat to achieve the white flour which consumers demand, vitamins and minerals are unavoidably lost. Enrichment restores the following important nutrient factors: thiamine, riboflavin, niacin, and iron. Some processors add calcium, too. Enrichment thus provides better nutrition.

This is one of a series of articles which is being published in professional nutrition and dietetic journals, and which will be widely distributed for educational purposes. Reprints of this and all other chapters are available without charge. Write to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

*This is the title of a definitive history of milling by John Storck and Walter Dorwin Teague, published by the University of Minnesota Press at Minneapolis and copyrighted by the University of Minnesota. It is used with permission as a source of material for this series of advertisements.

The next chapter titled: "The Business of Milling Begins" will be published in the near future.

Enriched with vitamins and iron for better nutrition



SAFE WAY TO DEAL in FUTURES

"Bill, I wish we could hedge all futures the way we hedge our wheat futures."

"What do you mean, Jim?"

"Well . . . today we're buying wheat for future use and we protect our business by hedging these purchases with flour contracts. How can we be sure . . . *dead* sure . . . that the phosphate we contract to buy will be the finest we can get for use next summer . . . when heat and humidity really test the stability and baking qualities of our self-rising flour and corn meal?"

"Uhmmm . . . that's sensible."

"You surely raise an important question, Jim. Thank goodness we have found the *safe* way to deal in that kind of future. We contract for V-90 and we have never had a single worry about shelf-life. We have used V-90 in our brands for more than 15 years and we're sure . . . *dead* sure . . . that it will continue to stand up under all conditions. Yes siree! When we deal with a future purchase that affects our brand reputation, we play safe. We specify V-90, the only phosphate that has stood the test of 15 summers."

YOU'RE SAFE . . . YOU'RE SURE WITH . . .

THE PH[illegible] HA[illegible] CRY[illegible] [illegible] TH[illegible] RA[illegible] COAT"*

V-90

*Coated Anhydrous Monocalcium Phosphate

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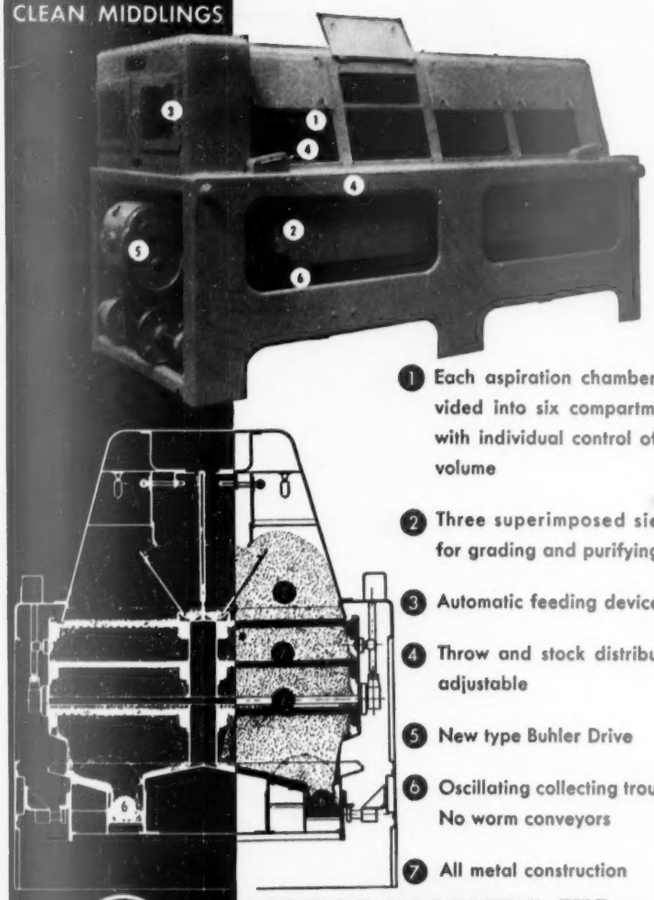
ALL METAL **Buhler purifier**

FOR MORE CLEAN MIDDLINGS



1. Each aspiration chamber divided into six compartments with individual control of air volume
2. Three superimposed sieves for grading and purifying
3. Automatic feeding device
4. Throw and stock distribution adjustable
5. New type Buhler Drive
6. Oscillating collecting troughs. No worm conveyors
7. All metal construction

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BUHLER BROTHERS (Canada) LTD.
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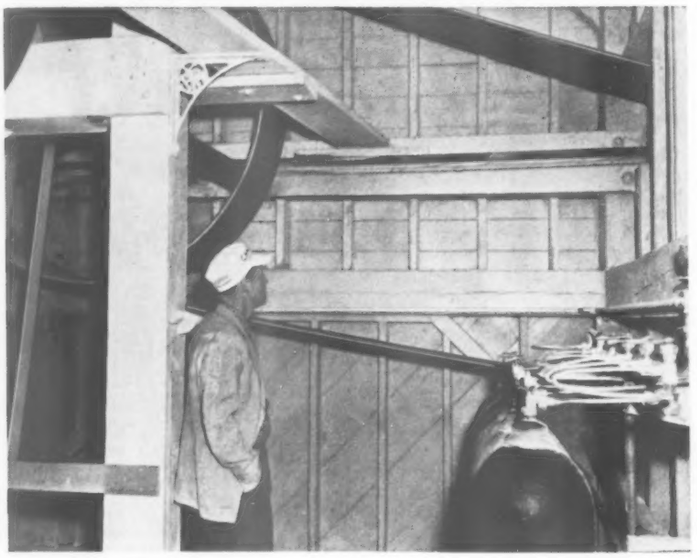
Fifty-Year-Old Belt Still in Service



A 50-year-old belt in the Preston-Shaffer Milling Co. plant at Athena, Ore., is still giving trouble-free service.

The Preston-Shaffer company built the mill in 1904, and before production began, the mill was completely belted with Graton & Knight flat leather belting.

Three of the original belts are still in operation. Outstanding is the main drive belt which is an 18-in. heavy double 69-ft.-long belt operated by a 150 hp. motor with a 34-in. diameter pulley to a 78-in. diameter pulley which drives the main line shaft at 250 rpm.

The mill has operated continuously since it was built, with shutdowns only for necessary repairs and modernization. During this half century period, it was pointed out, the belt has given trouble-free service. According to the best recollection of George Lowery, the present mill superintendent, the belt has not been shortened since 1909.

Records show that the belt was installed by a Mr. Phelps, who was Graton & Knight's belt man at Portland, Ore. Soon after the mill was erected, William Littlejohn took over the operating responsibility.

In the above picture, Mr. Lowery is inspecting the 50-year-old belt and the 78-in. diameter pulley in his mill.

STORAGE

OF CEREAL GRAINS AND THEIR PRODUCTS

J. A. Anderson • A. W. Alcock, Editors

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1954 • 6x9 • 515 pp. • 90 illus., 52 tables • 1120 references

Price: $11.00

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DURASET KREFELD

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A silk bolting cloth unsurpassed as to durability, accuracy of weave, sifting performance and all other properties required of a reliable bolting cloth.

DURASET

The new synthetic fiber bolting cloth. Made of synthetic fibers specially developed for the manufacture of bolting cloth. No plain weave but leno weave which ensures firm and non-shifting meshes. Main advantages: greater durability, more precise sifting combined with a larger sifting capacity, non-blinding.

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MILLING SYSTEM

(Continued from page 9a)

motors give you little or no trouble, but you will have a larger connected horsepower with individual motor driven machines. There will be savings that are important. However, we recognize group drives have more advantages, particularly in power distribution, and power factor must always be considered. Recently, we designed a large corn mill for a South American customer. The mill was built under a contract given our company which provided for individual motors on every machine including the rolls. Normally, we use battery driven rolls, each battery having four to six mills driven by one motor or two motors as will work out best. The Allis Chalmers battery driven mills provide a fine solution for saving building space and lowering maintenance costs.

In conclusion, I would like to go into some history. In 1917 when I went with Nordyke & Marmon, mills were being built in all parts of the country. This was the start of the "Daylight Mill." Buildings were of concrete construction. Back in those days, there were many mill builders —Allis Chalmers, Nordyke & Marmon, Great Western, Barnard & Leas, Robinson Manufacturing Company, Sprout-Waldron, and Wolf—the bidding was lively, you can imagine. The milling industry was built up to a great importance. Many family fortunes were made. The man who owned the mill was often the local banker. The history of some of the old milling families would make mighty interesting reading. A movie some years ago was developed around a milling family owning the Gladney Mill, Sherman, Texas, starring Greer Garson and Walter Pidgeon. This was a terrific story because it got close to the land, and concerned a family that played an important part in building this fine country of ours, where opportunities are now greater than ever.

Don't you young fellows get discouraged about our milling industry. The steel industry was suffering similarly until the continuous strip mill was introduced several years ago. Millions were spent in rebuilding the steel industry. When one mill put in a continuous operation, others had to follow on account of lower manufacturing costs.

Back in the mill building period of 1917 to 1923, I was the estimator for Nordyke & Marmon. Naturally, I take pride in the fact that wherever I go in the country, I find mills in which I had a hand in creating, but as a machinery manufacturer, it is discouraging to see the fine condition of these plants that were built back 30 or more years ago. They are monuments to the engineers and companies that created them. The machines are still running well, and producing good products—in many plants I have been told they do not know what the sifter bearings look like—in other words, years of trouble free operation.

When better mills are demanded, we will build them. Milwaukee is proud of the contribution Allis Chalmers and its predecessor, Nordyke & Marmon, made in building the milling industry of this country and serving it during the many years since. Allis Chalmers is proud of its standing today in the milling industry, in the electrical and mechanical power field, agriculture, chemicals and food industries.

I want to thank you men for the most excellent cooperation you gave us during the period when we developed our new line. At that time we mailed 800 questionnaires to mill operators and superintendents. The response was fine—we were guided largely by this information in our design work. This followed a long established policy of Allis Chalmers to build machinery the way you have wanted it. Your endorsement is evidenced by orders totaling in excess of 1,700 units. I also want to express appreciation for the fine suggestions received from your research committee. I am sure you will always find Allis Chalmers eager to assist you in your problems, whether they are operational, mechanical, research, new development or power. We, at Allis Chalmers want to continue to work closely with you as we have in the past. Fortunately, the grain milling section is tied in with a large assembly of engineers for power, mechanical, and metallurgical problems —a large research department is available to us and numerous facilities for testing physical properties of materials and their application.

—BREAD IS THE STAFF OF LIFE—

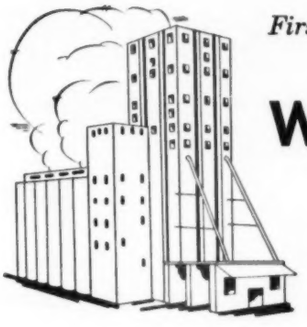
HAMMOND SALES OFFICE

WELLSBURG, W.VA. — Effective recently all sales activities for Hammond Bag and Paper Co. in Michigan are being handled from Chicago, according to an announcement by M. E. Greiner, vice president. J. E. Cornell, Jr., and W. A. Sheets, who represent Hammond, are located at 38 S. Dearborn St. They will service accounts in Michigan and throughout their present territory.

—BREAD IS THE STAFF OF LIFE—

GRAIN COMPANY ORGANIZED

McPHERSON, KAN.—A new firm, the 81 Grain Co. has opened here. The firm has 115,000 bu. storage capacity. Willis Krell, Elmer Ratzlaff, Earl Mathes and Don Walstrom, all of McPherson, organized the company.



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First, SAFETY—***more all-around practical safety***—for those who have to apply it or be around it; for the elevator or plant; for the treated grain; for the products into which the grain will be processed.

Now ***safety*** is a purely ***relative*** word when used with reference to grain fumigants. ***All*** grain fumigants offer possible hazard to human safety. ***Many***, because of low-flash-point vapors, present potential hazard to both plant and personnel. A ***few*** have or may have adverse effects on grain or processed products, such as objectionable residues or residual odor, or loss of testweight.

Hence, to keep the record straight, we will restate the foregoing. ***Most*** grain fumigants have ***no*** adverse effects on grain or processed grain products. ***Most*** grain fumigant ***types*** are fully as free from fire or flash-point as Weevil-Cide. ***Most*** grain fumigants are, in a chemical sense, no more toxic to man than Weevil-Cide.

In what way, then, is Weevil-Cide superior? ***What do you get with Weevil-Cide which makes it safer?***

A product backed by a company who for 25 years has not only recognized that fumigants are hazardous, but has never sought to minimize that hazard to users.

Weevil-Cide labels have long warned against a user entering a bin to apply fumigant. Weevil-Cide labels advise use of a gas mask with certain types of application and follow this up by specifying the exact type of canister to use.

We have gone further. Years of field experience in practical grain fumigation have formed the basis for a series of publications on all phases of safety in treating grain. A current booklet, ***Weevil-Cide Fumigation Handbook***, devotes several pages to such subjects as "Scope of Usage," "About Safety" and about proper use and limitations of gas masks. We have supplemented such publications with much verbal and written advice on safe procedure.

In other words, Weevil-Cide publications and labels go as far as they can in ***sharing*** responsibility for the safety of the user. By contrast, labels on many other grain fumigants repeat such statements as, "Buyer assumes all risk of use or handling, whether in accordance with directions or not."

We grant that labels and warning literature are often not read — or are ignored. What then? Well, here is where the product itself can help. Weevil-Cide has most exceptional warning characteristics. So much so that users are ordinarily unable to stay in dangerous concentrations.

Considering how often basic precautions are ignored, considering the special situations that can arise, we believe that the excellent warning properties of Weevil-Cide have had much to do with its 25-year record of safety.

Weevil-Cide
The DEPENDABLE GRAIN FUMIGANT

Listed by Underwriters' Laboratories, Inc.

For Information, Write.

THE WEEVIL-CIDE COMPANY
1323 Union Avenue Kansas City 1, Missouri

GRAIN FUMIGATION

By Paul McSpadden

EDITOR'S NOTE: The accompanying article is from a talk by Paul McSpadden of the Commander-Larabee Milling Co., Minneapolis, at the 25th annual convention of the Grain Elevator and Processing Superintendents in Chicago.

In the treatment of grain, the primary concern is the safety of your employees. Our civilization in the U.S. has not yet advanced, nor retarded, to the extent that we are not greatly concerned with the well-being of our fellow men, and let us hope that such a time will never come.

Any material used as a fumigant to kill bugs will kill men. Perhaps it will require more of one than another to do this job, or a longer exposure for one than another, which is the same thing your fumigant man will tell you about killing insects in your grain.

Any one around your elevator or plant who has anything to do with fumigants should become well acquainted with their composition, their dangers, protective measures, actions on insects, and, in fact, everything possible there is to know about the materials. Only by becoming well acquainted with anything do we lose our fear and learn to respect.

The next consideration of a grain fumigant is whether it is safe from fire or explosion. I doubt that there is an elevator superintendent who is not aware that he has an elevator that can be a potential keg of dynamite. Much has been done to lessen the chances of fire or explosion. Still occasionally they go, and it goes without saying that none of you wish to invite this trouble. Each individual elevator presents a different condition, both from the standpoint of physical structure and personnel employed. All these factors must be considered in choosing a fumigant that will measure up to your particular need from a fire explosion standpoint.

The principal cause of grain fumigation failure is not the inability of the fumigant to kill. The No. 1 reason is failure to train your personnel on the how, the why and the where to treat grain. Don't expect an untrained man to do a good job of treating a bin of wheat or other grains if you merely tell him to go to the bin floor, pour so much fumigant in such and such a bin every 20 minutes. Grain treatment has become a very vital part of handling an elevator. It can also be a very expensive part, especially if it is not done, or not done properly.

It is important that considerable time should be spent in explaining to your workmen the basic principles of grain fumigation before they are actually asked to carry out the work. Following a session conducted to cover the basic ideas, put on a demonstration on just how you want the work carried out, and don't do this in the locker room, or the conference room, but right up there on the bin floor where the workman will be expected to do the same thing. During these sessions see that he is given the training that will develop his respect for the fumigant.

If it is necessary to wear a gas mask for protection, show him a gas mask and explain its uses and limitations. Have him put it on, and breathe through it; have him smell some grain fumigant.

Perhaps the No. 2 reason for grain fumigation failure is a matter of under-dosage. Hundreds of thousands of gallons are used annually on refumigation of grain just because somebody tried to cut the dosage. It is a natural thing for all of us to want to fumigate grain just as cheaply as possible. We are also aware that one good fumigation is much cheaper than two treatments, especially if the first one has been a failure.

In most cases you will find the recommendation on the manufacturer's label as to minimum dosage which will do a satisfactory job of fumigating grain, if every condition is ideal as to grain moisture, grain temperature, bin tightness, grain cleanliness and all the other factors which go to make up ideal conditions for treating grain. If one or all of these factors fail to be ideal, allowances must be made in the amount of fumigant used. This is true regardless of the type of fumigant.

The question is often asked as to what dosage should be used on different types of bins—concrete, steel, wooden, closed top, open top, and for various types of grain. In my opinion, you can not write a simple prescription to cover all of these conditions, with all types of fumigants on all types of grain. The fumigants used will vary as to the quantities needed. Grain conditions as to moisture, temperature, cleanliness will require a variation in dosage.

My suggestion is to follow the ad-

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vice of your fumigant supplier as to dosage requirements. His supporting data for dosage requirements is based on a great deal of work, done under varying conditions of storage, in checking results of grain fumigation. Knowing a number of these fellows personally, and having worked with many of them, let me assure you that they do not always go around in a white shirt with collar and tie. They've jumped right in and dug for this information, and it is yours for the asking.

New Developments

Two new developments in the past several years are of interest in the treatment of grain. One of these is the automatic applicator for liquid fumigants. This consists of a pump unit to transfer the fumigant from the ground level to the bin floor where it is to be used. The control unit consists of a pair of microflex recess timers which will deliver automatically at pre-determined intervals dosages of fumigant into any bin desired. These controls can be mounted in the superintendent's office or any place desired.

Good results have been obtained in a limited amount of applications with this equipment. More universal use of this type of treating equipment will probably develop.

Some development work has been done and is being carried out, using methyl bromide in a circulating system through a tight bin of grain. This system requires a tight duct work from the top to the bottom of the bin being treated to circulate the methyl bromide through the grain in order to obtain a satisfactory distribution, and also to aerate the grain following the fumigation.

Most of the work that has been done has been exploratory, but the results have shown up well.

There has been developed a new type of gas testing equipment which makes it possible to determine accurately the concentration of gases through a mass of grain. This should prove beneficial with the menthyl bromide type of treatment, as well as with other types of gases.

Sanitation Program

Elevators are still subject to inspection by Pure Food and Drug officials. Only in extreme cases is it likely that any action may be taken at the present time. No word has come from the secretaries of agriculture and health, education and welfare regarding action on a national grain sanitation committee report which reached them some time ago.

Rumors point to a continuation of the educational phase of the grain sanitation program on an accelerated scale. Little action is expected in the near future regarding insect contamination, but a renewal of the rodent contamination phase on a higher level can be expected soon.

There is another angle on insect control around grain elevators that I would like to touch briefly. This is a matter of spraying with the residual type insecticide. It has often been questioned whether the results obtained in applying insecticides in an elevator justify the cost. The same thing is asked in other industries. If a residual insecticide is properly applied to a clean surface at regular intervals, the answer is a definite yes. If the surface can not or will not be cleaned before it is sprayed, and at regular intervals between sprayings, you are wasting your time and material.

Good housekeeping and spraying are designed to avoid infesting your grain with your own bugs. Grain fumigation is designed to control the insects brought into your elevator in your grain receipts. To guarantee insect-free grain it requires a combination of good housekeeping, spraying and grain fumigation.

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Accident Reductions Achieved in 1953, Safety Council Says

CHICAGO — Workers employed by member companies of the National Safety Council had the safest year on record in 1953, bettering their previous record performance in 1952, NSC has announced.

Industrial injury rates for last year, released by the Council in advance of the 1954 edition of its annual statistical yearbook, "Accident Facts," show a substantial reduction in both frequency and severity of 1953 accidents as compared with 1952.

Thirty-four of the 40 basic industry classifications reduced their frequency rates, and 24 reduced severity rates.

The average accident frequency rate for employees in all industries submitting company reports to the Council, based on the number of disabling injuries per 1,000,000 man-hours, was 7.44 in 1953—a reduction of 11% from the year before.

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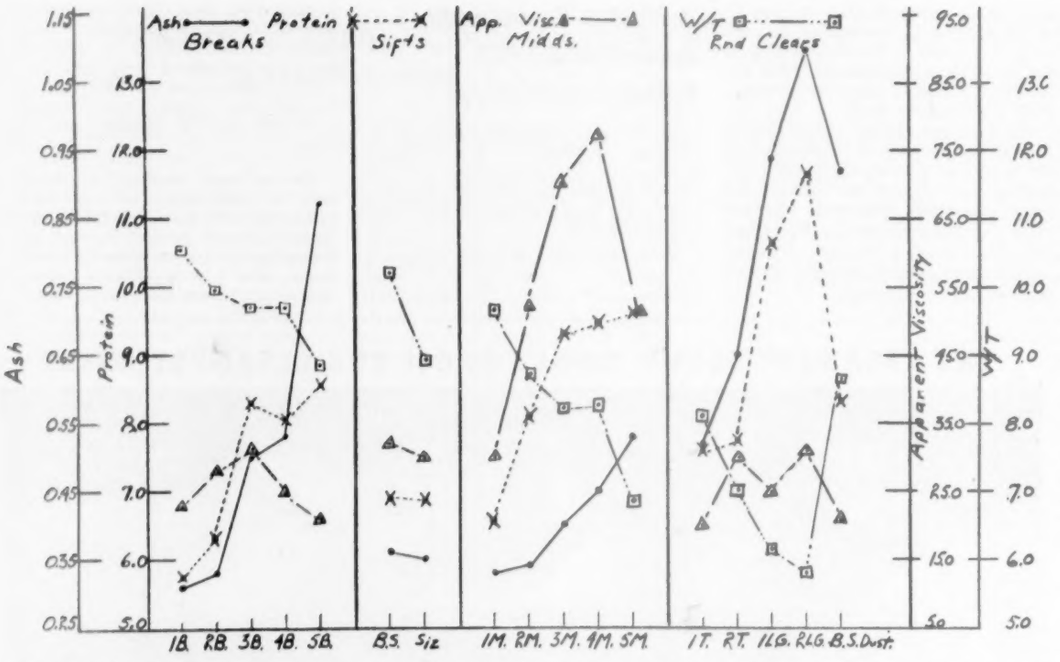

FIG. 3 — Interrelationships between protein, ash, apparent viscosity and spread factor (W/T) for various flour streams from Michigan Mill A utilizing soft white winter wheat from the late portion of the 1949 crop.

COOKIE FLOUR

(Continued from page 1a)

from the first to the fifth break. The flour from the break sift reels yield cookies of good spreading properties; they differ less than would be expected from their viscosity value. The five middling streams spread less than the break and break sift flours, and after the second middlings, this value drops sharply and the cookies develop rather smooth tops, which indicate "hardness." The sizings and first tailings flour produced good cookies, but the second tailings flour, the two low grade streams, feed reel, finishing reel and third clear reel flours all gave poor cookies. The spreading properties of flour from the bran and shorts duster were no better than those of such streams as the third middling and second tailings flours, although the apparent viscosity is comparable to that for the first and second break flours.

When the samples from Mill A taken from the early part of the 1949 crop were rebaked after storage for eight months at 5° C. the apparent viscosities were essentially unchanged, whereas the spreading properties appeared to show some improvement.

Same Trends

The cookie tests and samples from Michigan Mill A taken from the late part of the 1949 crop revealed the same trends in cookie quality from the head to the tail of the mill, as were shown by the earlier samples. Figure 5. This was also true for the mill streams taken from Michigan Mill B as can be seen from Figure 6. The same generalizations can be drawn from Figure 7 showing cookies baked from various streams taken from Mill C in Washington, which was operating on an entirely different type of soft wheat from that of the two mills in Michigan. There is a gradual loss in spreading property in

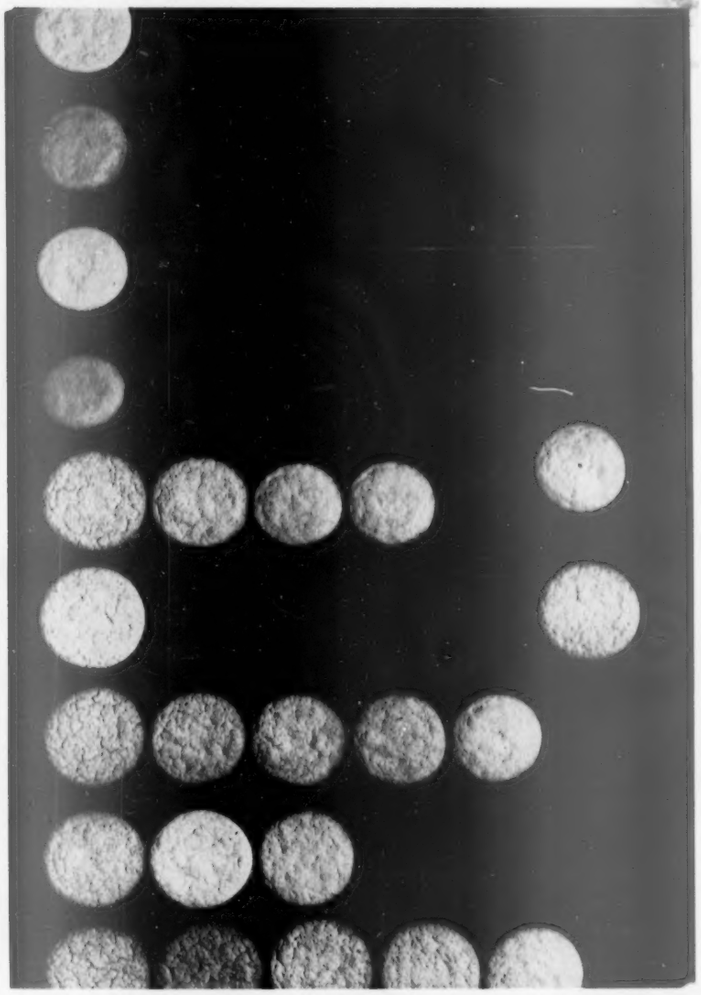

FIG. 4—Cookie characteristics of the various streams from Mill A, utilizing soft white winter wheat from the early part of the 1949 crop. Reading from bottom to top and left to right, the cookies represent the following streams: Row 1—break streams 1, 2, 3, 4 and 5. Row 2—break sifts 1, 2 and 3. Row 3—middlings streams 1, 2, 3, 4 and 5. Row 4—sizings; 90% patent (all breaks, first four middlings, all break sifts, sizings, both tailings and first low grade). Row 5—first and second tailings; first and second low grade; 10% clear (fifth midds., second low grade, finishing reel, bran and shorts dusters, third clear reel, feed reel). Row 6—feed reel. Row 7—finishing reel. Row 8—third clear reel. Row 9—bran and shorts duster.

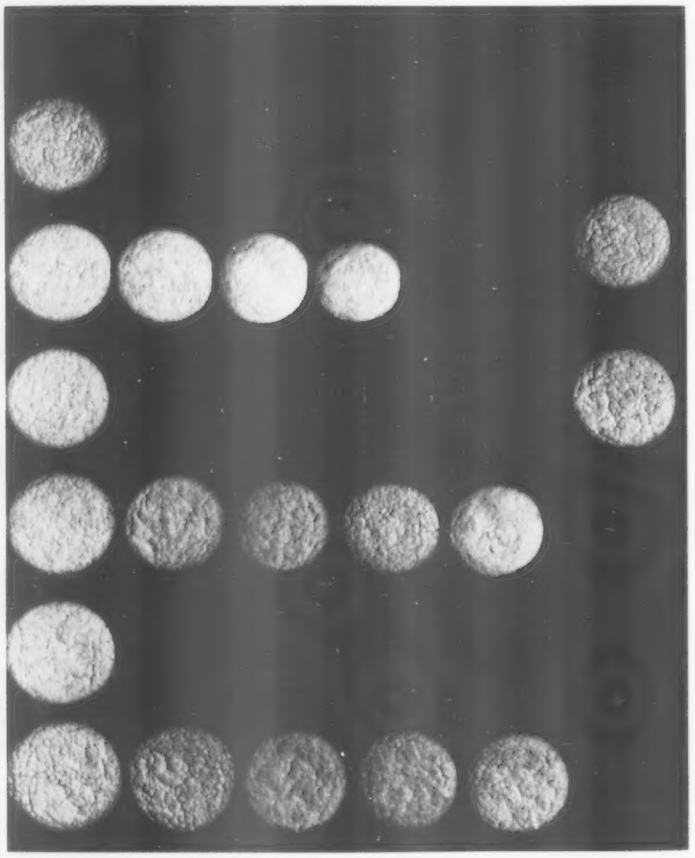

FIG. 5—Cookie characteristics of the various streams from Michigan Mill A utilizing soft white winter wheat from the late part of the 1949 crop. Reading from bottom to top and left to right, the cookies represent the following streams: Row 1—break streams 1, 2, 3, 4 and 5. Row 2—break sifts. Row 3—middlings streams 1, 2, 3, 4 and 5. Row 4—sizings; 90% patent. Row 5—tailing streams 1 and 2; low grade streams 1 and 2; 10% clear. Row 6—bran and shorts duster stream.

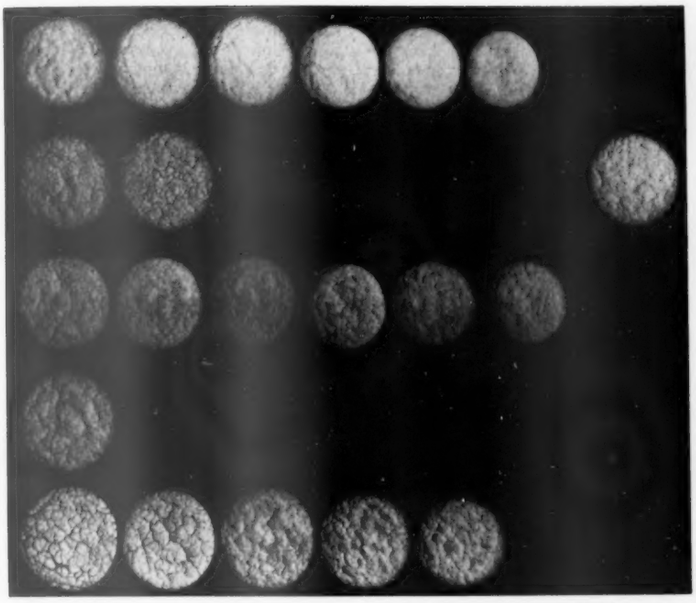

FIG. 6—Cookie characteristics of the various streams from Michigan Mill B utilizing soft white winter wheat from the 1949 crop. Reading from bottom to top and left to right, the cookies represent the following streams: Row 1—break streams 1, 2, 3, 4 and 5. Row 2—break cuts. Row 3—middling streams 1, 2, 3, 4 and 5. Row 4—quality and sizings streams; patent flour. Row 5—tailings 1, 2 and 3; low grade 1, 2 and 3.

progressing from the splitter break through five breaks. The middling streams do not spread as well as the break streams; indeed the variation shown by the different middlings flours cover the full ranges of spread and top grain encountered in streams from this mill. The quality, sizings, good and poor suction, and first tailing streams yielded fairly satisfactory cookies, but the quality of the cookies from the second tailings and low grade flour was poor. The cookies from the bran and shorts duster flour had desirable properties.

The relation between the spread factor and the various streams obtained from Mills A, B, and C in the 1950 crop is shown in Figure 8. The

(Continued on page 18a)

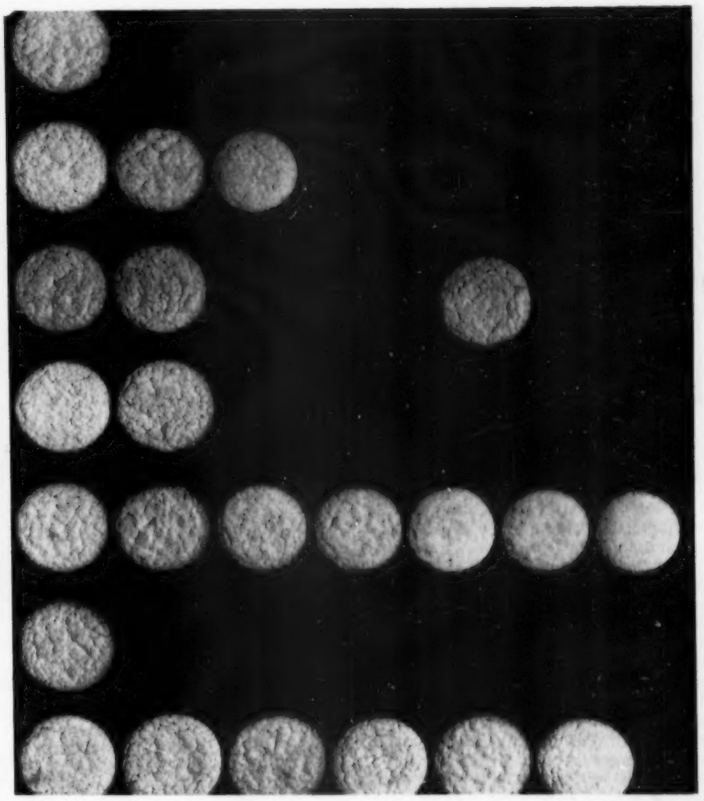

FIG. 7—Cookie characteristics of the various streams from Washington Mill C, utilizing soft wheat from the 1949 crop. Reading from bottom to top and left to right, the cookies represent the following streams: Row 1—splitter break and break streams 1 to 5 inclusive. Row 2—break redust. Row 3—middlings 1 to 7 inclusive. Row 4—quality and sizings. Row 5—good and poor suction; 100% flour. Row 6—tailing 1 and 2; low grade. Row 7—bran and shorts duster.

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No. 4024—Spot Fumigant

A new, patented spot fumigant, in combination with a new spot fumigant applicator, has been announced in a bulletin issued by Ferguson Fumigants, Inc. The new fumigant is a patented mixture which is claimed to possess a high degree of synergism. One or two ounces are required at each point of application. Application is made by a portable machine through quarter-inch holes, pre-bored in cereal handling and processing equipment. The machine is activated by air pressure and delivers a preset dosage through a 100-ft. length of plastic tubing each time a button on the machine is depressed. Cost reduction in both material and labor for effective spot fumigation is claimed. To obtain a copy of the bulletin, check No. 4024 on the coupon and drop it in the mail.

No. 2961—Scalper

The development of what is called the first all metal reel scalper has been announced by the Strong-Scott Manufacturing Co. This new machine, designated the No. 4 reel scalper, will remove particles either larger or smaller than the material to be cleaned depending on the mesh of the screen used. Some of its uses are to remove straw, strings, clods and other refuse from a stream of whole or ground grain. It is also used to separate fines from pellets and crumbles, the company states. The machine is constructed of steel or aluminum. The reel is clothed with heavy wire mesh screen. The heavy reel shaft is extended so drive can be placed at either end. Internal ledges have been eliminated in the design of the machine to prevent infestation. Shaft bearings are ball bearings requiring lubrication about twice each year. For more complete information check No. 2961 on the coupon and drop it in the mail.

No. 2955—Booklet on Rust Disease

A new publication titled, "A Brief History of the Rust Disease," by W. G. Malaher, has been published by the Searle Grain Co., Ltd. Mr. Malaher is director of the research department of the Searle Grain Co., Ltd. Sections of the 16-page booklet deal with the Canadian story on rust, a summary of the wheat stem rust situation up to this time, the need for research and an outline of the damage caused by the disease in western Canada since 1896. To secure the booklet check No. 2955 on the coupon and drop it in the mail.

No. 3540—Education Brochure

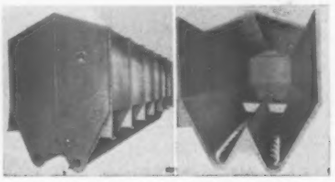
A new brochure has been published by the College-Industry Committee on Material Handling Education. Recognizing the need for college-trained men in the field of material handling, the Material Handling Institute and the American Material Handling Society have jointly sponsored the College-Industry Committee with eight objectives such as to act as a central source and authority on sound, authentic information on material handling education. This information, which is contained in the brochure, is available by checking No. 3540 on the coupon and mailing it.

No. 2943—Control Panel Bulletin

A bulletin on control panels for use with weighing and materials handling systems as well as other industrial uses has been offered by the Richardson Scale Co. The bulletin pictures 27 typical panels and includes the names of companies for which the panels were engineered. Listed are control panel applications for food and feed processing operations and other operations. Also included are photos showing panels being fabricated. To obtain a copy of the bulletin, check No. 2943 on the coupon and mail it to this newspaper.

No. 3582—Storage Bins

Horizontal storage bins for storing bulk material in buildings with limited head room are being produced by the Day Co. These are bolted type bins, are 11 ft. high and can be furnished in a variety of



lengths, according to the company. Bolted sections can be inserted to make the bins taller or longer as desired. The panel at the left shows the six section, standard height bin while the right panel, an interior view, shows the discharge screws. For more complete details check No. 3582 on the coupon and drop it in the mail.

—BREAD IS THE STAFF OF LIFE—

TRAFFIC MANAGER NAMED

NEW YORK—The appointment of Olaf N. Rye as general traffic manager for International Paper Co. has been announced by J. H. Hinman, chairman of the board. Mr. Rye, who has served as traffic manager since early 1953, replaces the late Hugo Ignatius, who died April 29.

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COOKIE FLOUR

(Continued from page 17a)

streams are arranged in proper progression into various groups and the graphs clearly show how the spread factor diminishes within each group and from the head to the tail of the mill.

These results clearly show that the break streams make better cookies than the middlings streams. With this information at hand, a mill was modified to obtain a greater release of stock at the break rolls and consequently, a greater yield of break flour. This modification, coupled with stream selections, yielded an improved cookie flour.

Soft wheat milling techniques might well be reviewed to determine whether the tradition inherited from hard wheat milling, namely to produce a maximum of middlings stock, might not be revised advantageously in the direction endeavoring to secure a maximum yield of break stocks. Other revisions of the flow and in the balance of the mill may lead to the production of improved cookie flour.

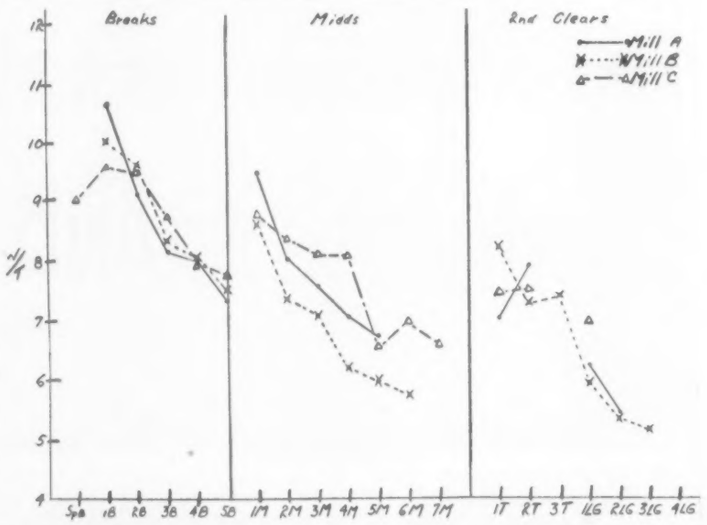
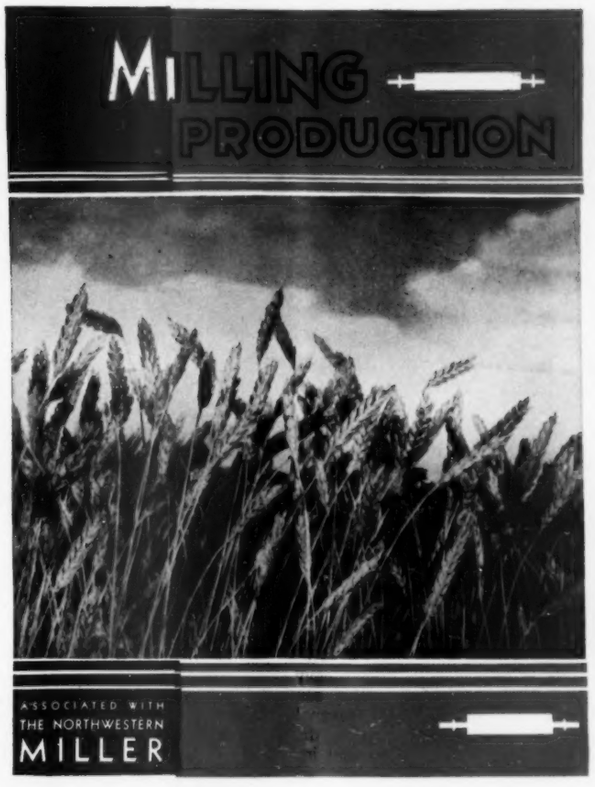


FIG. 8—Comparison of the spread factor (W/T) for cookies baked from various streams obtained from three mills. Mills A and B were located in Michigan and Mill C in Washington.



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